DOCUMENT RESUME

ED 435 028 CE 079 281

AUTHOR	Dumbrell, Tom
TITLE	Electricity, Gas and Water Supply. Industry Training Monograph No. 4.
INSTITUTION	National Centre for Vocational Education Research, Leabrook (Australia).
SPONS AGENCY	Australian National Training Authority, Melbourne.
ISBN	ISBN-0-87397-480-8
PUB DATE	1998-00-00
NOTE	34p.; For other Industry Training Monographs, see CE 079 276-289.
AVAILABLE FROM	National Centre for Vocational Education Research, 252 Kensington Road, Leabrook, South Australia 5068, Australia ($12.95; $9.95 each if 10 or more of the series are purchased.) For full text: <http://www.ncver.edu.au/voced.htm>. e-mail: ncver@ncver.edu.au
PUB TYPE	Numerical/Quantitative Data (110) -- Reports - Research (143)
EDRS PRICE	EDRS Price MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS	Apprenticeships; Education Work Relationship; Electrical Occupations; Employer Attitudes; Employment Level; Employment Opportunities; *Employment Patterns; Employment Projections; *Employment Qualifications; *Energy Occupations; Foreign Countries; Graduate Surveys; Labor Market; Labor Needs; National Surveys; *Outcomes of Education; Postsecondary Education; Program Effectiveness; Tables (Data); *Utilities; *Vocational Education; Water Quality; Water Resources; Water Treatment
IDENTIFIERS	*Australia

ABSTRACT

Australia's electricity, gas, and water supply industry employs only 0.8% of the nation's workers and employment in the industry has declined by nearly 39% in the last decade. This industry is substantially more dependent on the vocational education and training (VET) sector for skilled graduates than is the total Australian labor market. Despite the low numbers of workers, government support for training is relatively high. Employers in this industry were the third highest among all industries in terms of spending on employee training. Employers are quite satisfied with VET provision, and over 81% of students working in the industry received some form of study assistance from employers. VET graduates gave particularly low scores to information on courses, careers, and jobs. (An appendix contains three tables of statistics: national shifts in employment in various industries in Australia; numbers of persons employed in various occupations in the electricity, gas, and water supply industry from 1987-1996; and educational attainment of persons in occupations within the industry.) (KC)

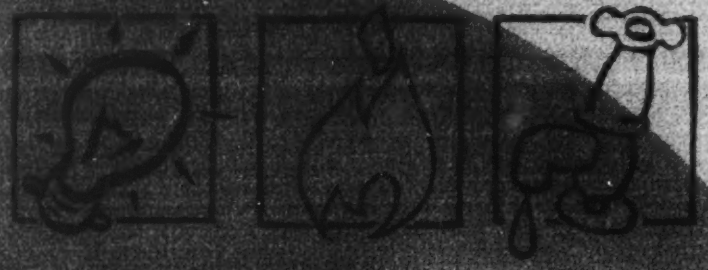
Reproductions supplied by EDRS are the best that can be made
from the original document.

ED 435 028

Industry training monograph

NCVER

Electricity, gas and water supply



U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

S Hayes

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

CE079281

WHERE'S ... STRY GOING!

BEST COPY AVAILABLE

NCVER

Industry training monograph

Electricity, gas and water supply

1998

© **Australian National Training Authority**

This work has been produced by the National Centre for Vocational Education Research (NCVER) with the assistance of funding provided by the Australian National Training Authority (ANTA). It is published by NCVER under licence from ANTA. Apart from any use permitted under the Copyright Act 1968, no part of this publication may be reported by any process without the written permission of NCVER Ltd. Requests should be made in writing to NCVER Ltd.

The views and opinions expressed in this document are those of the author/project team and do not necessarily reflect the views of the Australian National Training Authority.

ISBN 0 87397 480 8

TD/TNC 55.15

Published by

NCVER Ltd

252 Kensington Road

Leabrook, South Australia 5068

Quality System

Quality Endorsed Company

Preface

THE ELECTRICITY, GAS and water supply industry training monograph is one of a series of monographs which has been designed to provide readers with an overview of occupational trends and the current training effort in each industry in Australia.

The monograph analyses data at the major Australian and New Zealand Standard Industry Classification (ANZSIC) industry division level, given that it is at this level most data are collected and disseminated. The monograph addresses:

- recent employment trends
- recent occupational trends in key skills areas
- current training arrangements, particularly training levels and outputs

The monographs bring together for the first time a range of survey data from the Australian Bureau of Statistics (ABS), together with graduate destination, employer satisfaction with training and other training data compiled for the Australian National Training Authority (ANTA) by the National Centre for Vocational Education Research (NCVER).

I would like to thank Tom Dumbrell for preparing these monographs and I would also like to acknowledge John Ray's contribution to the analysis of employment and occupation data.

NCVER acknowledges ANTA's significant contribution to the cost of this monograph in sponsoring its publication.

I hope that the material in this publication will be of interest to Australia's vocational, education and training (VET) sector. In particular the document is designed for industry decision-makers, policy-makers, teachers and trainers, researchers and students with an interest in VET.

Readers who are interested in more information about training markets or other areas of VET research are referred to the NCVER's research database, VOCED. Printed and diskette versions of VOCED can be obtained from NCVER (ph +61 8 8333 8400) or it can be accessed directly on the world wide web at the following address:
<http://www.ncver.edu.au/voced.htm>

Chris Robinson, National Centre for Vocational Education and Research Ltd

Contents

The electricity, gas and water supply industry in Australia *1*

Overview *1*

An industry snapshot *2*

Employment trends within electricity, gas and water sub-divisions *4*

Occupational composition *4*

Qualifications profile *5*

Occupational trends and skills shortages *6*

Hours of work and earnings *7*

Geographical distribution of electricity, gas and water *7*

Training in electricity, gas and water *8*

Employer satisfaction with VET *8*

VET graduates in electricity, gas and water *9*

Employer support for training *10*

Some training issues in electricity, gas and water *11*

Emerging VET issues *12*

Appendix *13*

The electricity, gas and water supply industry in Australia

Overview

THE THREE INDUSTRIES grouped under this heading together make up the smallest of the 17 major industry divisions used by the Australian Bureau of Statistics (ABS). In 1996–1997 average employment in this sector nationally was only 66 700 persons, representing 0.8% of total Australian employment. By November 1997 the employment level had fallen further to 64 800.[1]

Perhaps the most important feature of this sector for vocational education and training (VET) is the sharp decline in employment experienced by the sector over the last decade. In 1987 there were 126 400 employed in the industry across the nation in these activities. By 1996 employment had declined by nearly 39%—the greatest decline over the period in percentage terms of any industry.

Some of the factors that have driven this decline are corporatisation and privatisation of some areas of the industry, technological and other changes increasing labour productivity, and the outsourcing of some functions previously undertaken within the industry. This process is continuing and further reductions in employment can be anticipated. To some extent this reduction in employment has been offset by an increase in those areas to which some functions are outsourced. This increase in employment is reflected in strong growth in the property and business services sector, the subject of a separate monograph in this series.

This industry is involved in the production and distribution of electricity and gas, and in the management of water resources. They are grouped into one industry division probably because historically they have been activities conducted normally as government or quasi-government monopolies. For this reason this industry has by far the smallest number of enterprises of any of the industry sectors (excluding government administration and defence).

[1] ABS, *Labour force, Australia*, cat.6203.0, November 1997

An industry snapshot

As noted above, this is the smallest of the 17 divisions into which the ABS divides the Australian economy. Corporatisation, increased efficiencies and outsourcing have seen the industry's employment decline by nearly 40% over the last ten years, the most marked fall in employment of any industry division.

Employment in electricity, gas and water is distributed into two sub-divisions, electricity and gas supply, which accounts for the majority of employment, (November 1997), at 41 900 persons; and water supply, sewerage and drainage services, with 22 900 employees. Only 15% of those employed in the industry are females and fewer than 4% of persons in the industry work part time.

Despite the industry's continual decline in employment over recent years, the gross product of the industry has grown consistently. Over the decade to 1994–1995 the sector's gross product rose by around 35%, while over the same period total employment fell by nearly 42%.

Table 4.1: Employment ('000s) in electricity, gas and water supply by sub-division, by gender and type of employment, Australia, November 1997

Industry sub-division	Males	Females	Full-time	Part-time	Total
Electricity and gas supply	37.0	4.8	41.0	0.9*	41.9
Water supply, sewerage and drainage services	17.7	5.2	21.3	1.6*	22.9
Total	**54.8**	**10.0**	**62.2**	**2.5***	**64.8**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, November 1997

After mining, this sector had, in 1993–1994, the highest labour costs per employee and also the second highest average earnings per employee.

2

The outlook for each sector needs to be considered separately. In the electricity generation and supply sector there are several key issues that will determine the future course of the industry. It is clear that demand for energy in Australia is growing strongly and this growth is likely to continue for the foreseeable future.

In 1990 Australian consumption of electricity was 133 000 gigawatt hours. It rose to 153 000 gigawatt hours in 1995 and industry forecasts suggest that over the next 12 years consumption of electrical energy will rise by a further 37% to 206 000 gigawatt hours.[2] The main component in this growth in demand is forecast by the industry to be in the commercial sector, with growth in demand from mining and manufacturing also playing a major role. Demand from the domestic sector is forecast to be lower, as a result of rising efficiency in domestic appliances and in home design.

[2] Keith Orchison, executive director, Electricity Supply Association of Australia, *Sydney Morning Herald*, 11 March 1998

BEST COPY AVAILABLE

With protocols from the Kyoto climate change conference yet to be signed at time of writing, the impact of any decisions on the level of reduction in carbon-based fuels is difficult to assess. It seems likely that over the medium term, there will be growing national and international pressures to move away from coal-generated electricity to other technologies (including photovoltaics, [solar], wind generation, gas, methane, co-generation, nuclear and hydro-electricity).

While the costs of these alternative technologies in Australia are at present generally above the costs of coal-generated electricity, it is difficult to estimate what their relative costs might be, given scale economies. Hence, it is difficult to estimate whether future energy consumption will grow indefinitely as acceptable alternatives emerge, or whether better efficiencies in design will produce more savings through greater reductions in energy consumption. What seems clear, however, is that over the medium term there will be growth in demand for electrical energy, however generated, and for its distribution via existing technologies.

There are four major gas-producing regions in Australia: the Carnarvon Basin off north-western Western Australia, the Gippsland Basin off the Victorian coast, the Cooper Basin in South Australia and Queensland, and the Amadeus Basin in the Northern Territory. There are also thought to be large gas reserves associated with the major coal seams in the Sydney Basin and the Bowen Basin in Queensland.

There are few large private companies engaged in the gas sector. Companies that are involved often do so in joint partnerships. This is because gas is usually found in remote locations, it is expensive to extract and successful exploration is both expensive and uncertain. In addition, there are competitive pressures from other energy sources.

Natural gas accounts for about 18% of final energy consumption in Australia. Consumption levels are highest in Western Australia and Victoria. In recent years consumption of gas has grown most strongly in Western Australia and the Northern Territory, although nationally, overall consumption levels have only grown moderately.

Demand for natural gas is expected to rise strongly over the medium term as new resources, including imported gas from Papua New Guinea, become available. It is expected that natural gas will become an increasingly important raw material for the generation of electricity. At present about 14% of gas is used for electricity production. This is forecast to rise to 30% over the next 12 years. Overall natural gas' share of the total energy market is forecast to rise from around 18% currently to nearly 28% in 2010. At present employment in the natural gas sector is around 13 000 persons.

Unlike the energy producing part of the electricity, gas and water industry, water is not a commodity for which substitutes exist. Much of the focus of water distribution organisations is upon improved water conservation. As the Australian population grows it is clear that demand for water will rise. Major water resources close to Australia's major population centres have largely been developed. Thus expansion of water supplies to existing centres will become increasingly costly, as dams will be more remote from these centres. In addition, much of the supply infrastructure in place in

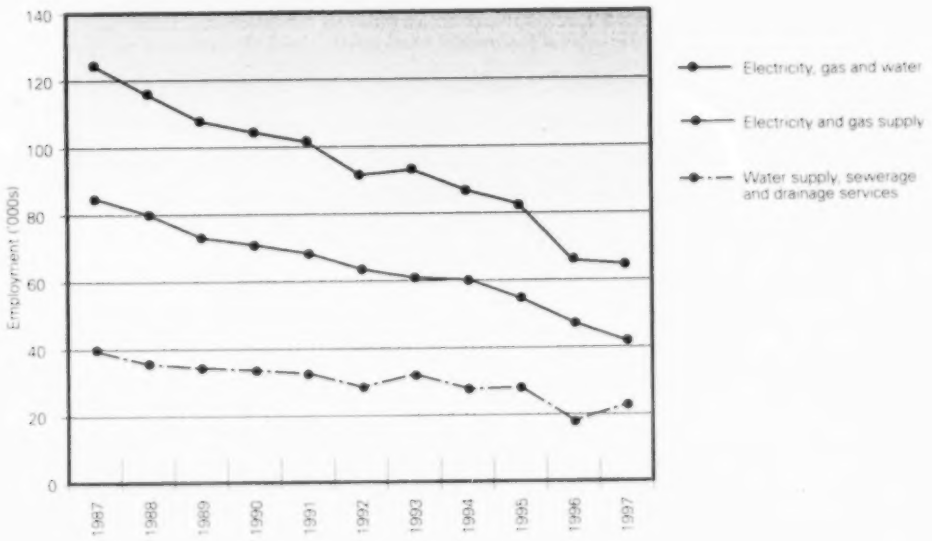
the main Australian cities is ageing, meaning that in the foreseeable future considerable maintenance will be required. It is unlikely, however, that this will lead to a significant increase in employment in the electricity, gas and water industry as such construction work is now outsourced.

Employment trends within electricity, gas and water sub-divisions

The following chart shows the employment trends within the industry's sub-divisions over the last ten years. The decline in employment is evident in both sub-divisions, although more pronounced in the energy area.

While there is unlikely to be recovery in employment levels in these industries directly, it seems apparent that in the energy sector there will emerge demand for new and alternative technologies, giving rise to related industries. Given the importance of water in a dry continent it is also reasonable to expect growing activity in areas related to water conservation—better planning of water catchment and run-off areas, better handling of sewerage, and better water conservation practices in industry.

Chart 4.1: Employment in electricity, gas and water, by sub-division, Australia, 1987–1997 (ABS labour force survey)



Source: ABS, *Labour force, Australia*, cat.6203.0, 1987–1997

Occupational composition

Despite the small size of this industry, it fairly closely reflects the composition of the total Australian workforce, with several exceptions. The electricity, gas and water industry's main variation from the total workforce is that it employs a proportionally

BEST COPY AVAILABLE

higher number of tradespersons and a correspondingly lower proportion of lower skilled white collar and manual workers. Table 4.2 compares the industry's occupational profile with the total workforce.

Qualifications profile

The qualifications profile of the sector closely matches the occupational profile of the whole labour force, although the industry has a significantly higher proportion of its workforce in the trades and related group.

Table 4.3 shows that the electricity, gas and water industry is substantially more dependent on the VET sector for its skills formation than the total Australian labour market. Overall 39% of the workers in the electricity, gas and water industry hold a VET-level qualification against an all-industry average of about 22%.

Electricity, gas and water has an average share of workers with university qualifications. It differs from the total workforce in that only one-third of its workforce lacks a post-school qualification, compared with almost half of the total workforce.

Table 4.2: Occupational profile, electricity, gas and water and total workforce, Australia, November 1997

Occupation group	Electricity, gas and water %	Total workforce %
Managers and administrators	7.9	7.6
Professionals	17.1	17.4
Associate professionals	12.3	10.5
Tradespersons and related	24.2	13.2
Advanced clerical and service	1.5	4.5
Intermediate clerical, sales and service	19.3	17.1
Intermediate production and transport	9.4	9.2
Elementary clerical, sales and service	2.3	10.5
Labourers and related	5.7	10.1
Total	**100.0**	**100.0**

Source: ABS, *Labour force, Australia*, cat.6203.0, November 1997

Table 4.3: Qualifications of electricity, gas and water workers, percentage distribution, Australia, May 1997

	Bachelor's degree or higher	Diploma/ associate diploma	Skilled vocational qualification	Basic vocational qualification	Without post-school qualification
Electricity, gas and water	17.1	15.1	23.9	10.4	32.9
Total industry	**17.2**	**9.0**	**12.6**	**9.4**	**49.4**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

Tables A4.3 and A4.4 in the appendix provide greater detail on the educational attainment by occupation of workers in this industry.

BEST COPY AVAILABLE

Occupational trends and skills shortages

Table A4.2 in the appendix shows the details of where the greatest declines in employment in this industry by individual occupation have occurred over the last ten years. At the broader minor occupational group level, the main reductions in employment have occurred as shown in table 4.4.

Employers in the electricity, gas and water industry, when surveyed in the 1997 employer satisfaction survey (ESS), generally felt that there were sufficient VET graduates to meet current needs. Only about 23% of employers identified skills shortages and these were overwhelmingly in the skilled trades area, with 88% of identified shortages in this category.

The National Utilities Industry Training Advisory Body Ltd (NUITAB) reported to the Australian National Training Authority (ANTA) in 1997 on skill shortages as follows:

> *In the electricity supply sector, there is a need for developing more linework and cable-jointing skills. This is an urgent need if long-term skill shortages are to be avoided.*
>
> *In the gas sector, there is potential for a medium-term shortage of skilled labour unless entry-level traineeships with multiple outcomes are implemented. There is an immediate skills shortage of gas fitters and gas mains and service workers in the New South Wales gas industry and potential for short-term shortages exist in the Queensland gas industry.*
>
> *In the electrical and electronic sector, there is a broad shortage of skills occurring nationally, with this trend expected to continue. There are also shortages in air-conditioning and refrigeration.*

Table 4.4: Employment ('000s), in electricity, gas and water by selected minor occupational group, Australia, 1987 and 1996

Occupational group	No. employed 1987	No. employed 1996	Change 1987–1996
Building professionals and engineers	8.8	4.9	–3.9
Business professionals	2.8*	6.1	3.3
Engineering and building technicians	8.8	4.2	–4.6
Other para-professionals	5.3	2.8*	–2.5
Metal fitting and machining trades	6.0	1.9*	–4.1
Electrical and electronics trades	18.3	14.1	–4.2
Building trades	6.0	1.7*	–4.3
Numerical clerks	7.3	4.0	–3.3
Miscellaneous clerks	5.9	3.0*	–2.9
Construction labourers	6.9	2.3*	–4.6
Labourers	6.0	2.1*	–3.9
Total	**126.4**	**77.5**	**–48.9**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, 1987, 1996

BEST COPY AVAILABLE

Hours of work and earnings

The electricity, gas and water industry is one of the most male dominated of all industries, behind only the mining industry. Almost 85% of workers in the industry are males, compared with 89% in mining and with the all-industry average of 56.6%. Less than 4% of the jobs in the industry are part time.

Table 4.5: Employment in electricity, gas and water, by sex and hours worked, Australia, November 1997

	Full-time ('000s)		Part-time ('000s)		Total ('000s)	
	No.	%	No.	%	No.	%
Males	53.8	86.4	1.0*	40.0	54.8	84.6
Females	8.5	13.6	1.5*	60.0	10.0	15.4
Total	**62.3**	**100.0**	**2.5***	**100.0**	**64.8**	**100.0**

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6203.0, 1997

The industry appears to have an ageing workforce. Only about 17% of the workers in the industry were born outside Australia, compared with the all-industry average of 24%. A higher proportion of the industry's workforce is aged 45 or more (28%), than the workforce as a whole (21%). Only 8.2% of the electricity, gas and water workers are aged under 25 compared with the total workforce, where 18.3% of the workers are aged under 25.

The electricity, gas and water industry also is second to the mining industry in per capita earnings. In 1993–1994 average earnings were $43 351 per annum, compared with the average across all industries of $32 755. Average hours worked in the industry are only slightly above average at 36.6 hours per week (November 1997), compared with the average for all employees of 35.6. Given the low level of part-time work in the sector, this is a low figure compared with the mining industry, which recorded an average of 43.9 hours per week.

7

Geographical distribution of electricity, gas and water

In general terms, employment in this sector is distributed more or less according to the distribution of the population. The following table shows the distribution as at August 1995.

Table 4.6: Employment ('000s) in electricity, gas and water by State/Territory, 1995

	NSW	Vic	Qld	SA	WA	Tas	NT	ACT
Males	22.9	18.4	12.8	6.0	8.7	1.6*	0.5*	0.6*
Females	5.4	3.8	1.9*	0.6*	1.3*	0.2*	0.1*	0.0*
Total	**28.3**	**22.1**	**14.7**	**6.6**	**10.0**	**1.8***	**0.6***	**0.6***

Note: *Subject to sampling variability too high for most practical uses

Source: ABS, *Labour force, Australia*, cat.6204.0, 1995

BEST COPY AVAILABLE

- The electricity, gas and water industry has experienced the sharpest decline in employment over the last decade of all industry divisions.
- The industry is strongly male dominated, has relatively few overseas-born workers, relatively few young workers and very little part-time employment.
- Over the next few years major changes in ownership structures and technology will have significant impacts on the nature and level of employment.
- The electrical power sector of this industry is at the forefront of environmental debate over greenhouse gas emissions and might see major changes in the longer term in response to international pressures.

Training in electricity, gas and water

Despite accounting for less than 1% of the total workforce, government support for the utilities training area (a close match for this industry) is relatively high. ANTA statistics show that in 1995, 4.8% of total training activity was directed towards the sector, while in 1996 this declined marginally to 4.6% (see table A4.1 in the appendix). In terms of hours of government-funded training activity per person, this amounted to 43 hours for the electricity, gas and water industry. Of those hours specifically allocated to industry-based training areas, about 55% of the total, this was the second highest after arts, entertainment, sport and recreation.

Unfortunately enrolment statistics are not available by the same breakdown as this, hence it is not possible to identify the level of enrolments specifically related to this industry sector. Many of the main occupations in this industry, especially trade and technician-level occupations, are common across several industries, including manufacturing, construction and mining. For example, there are about 6400 electrical mechanics employed in the industry, while construction has 47 000, manufacturing 10 100 and mining 4700. Therefore, identifying enrolments that will lead to employment specifically in the sector is difficult.

Employer satisfaction with VET

Employers in the industry gave a relatively high overall satisfaction score of 6.8 on a 10-point scale to VET provision in the 1997 ESS, compiled by the National Centre for Vocational Education Research (NCVER). Only four of the 17 industry sectors gave a higher rating.

Employers in the survey also tended to have relatively large numbers of recent VET graduates working for them, probably reflecting the relatively small number of large enterprises in the industry. Across the States and Territories there was, however, quite a marked variation in ratings, ranging from a low of 5 in the Australian Capital Territory

BEST COPY AVAILABLE

to 7.5 in Queensland. No other industry produced a wider range of satisfaction scores. The survey covered 60 employers in the industry across Australia.

Employers in the electricity, gas and water industry identified the highest priorities for service improvement as:

- to improve the work skills of graduates
- to improve the work ethic of graduates

These priorities were among the highest priorities for improvement identified by employers across all industries.

VET graduates in electricity, gas and water

The technical and further education (TAFE) graduate destination survey (GDS) 1997, also compiled by NCVER, included 428 VET graduates who were working in the electricity, gas and water industry when the survey was conducted. This was about 1% of the total, about equal to the industry's share of employment. Graduates responding to the survey working in this industry gave the second highest rating, in terms of the perceived relevance of their course, among all graduates surveyed. They were behind only the construction industry graduates who gave their training the highest relevance rating.

The industry's graduates most often had obtained a trade certificate (95 persons), followed by an associate diploma (69), an Australian Qualification Framework (AQF) certificate IV (67), or a certificate (other) (63). Compared with most other industries this is a high concentration of higher-level VET qualifications.

The industry was also the highest provider of some form of support to students during their final term of study. Over 81% of students working in the industry during their final term received some form of study assistance, generally in the form of paid fees and paid time off work. The overall average across all industries was around 51%.

Average weekly earnings for graduates in the industry were well above average. For all full-time and part-time workers, average earnings for males were $698 and for females $585. For full-time males, earnings were $706 and for full-time females, $618. This level of income difference was common across all industries surveyed and in all cases males earned more than females. The greatest differentials appeared to occur in the most male-dominated industries: mining; communication services; and electricity, gas and water.

Of those graduates who were not employed on graduation, only 67 out of the 428, most found their jobs in less than three months. Only 14 of the graduates were working on a part-time basis. More than half of the graduates working in the industry had been with their employer before, during and after their course.

When questioned about their satisfaction with various aspects of their course, graduates working in this sector usually gave ratings close to the all-industry average. There were several items, however, on which they gave very low ratings compared with all respondents.

BEST COPY AVAILABLE

Respondents gave particularly low scores to the information received when choosing their courses and to the information provided in relation to careers and jobs in the industry. In regard to the former, only 52.7% gave a score of 7 or more on a 10-point scale, while in regard to information on careers, only 29.5% gave a score of 7 or better. This issue of provision of information on careers scored poorly across all industries, with only 41.1% of all graduates rating it 7 or better. Nevertheless, the very low rating given by electricity, gas and water industry graduates should provoke critical examination of this issue specifically in respect of this industry.

Most of the graduates working in the industry had decided to do their course for work-related reasons. In order, their reasons were:

i to get a better job or promotion – 132 persons

ii because it was a requirement of my job – 97 persons

iii to get extra skills for my job – 82 persons

About 84% of respondents giving these reasons for doing their course said that they had either fully or partly achieved their aims.

It is not possible to give accurate data on the number of apprentices employed in the sector across Australia because of its small size. The ABS groups this industry under the 'other' category in the following table. It is likely that there are about 2000 apprentices in the industry across Australia. In the latest employer training practices survey (ABS cat.6356.0), the industry is shown to be one of the highest providers of structured training, with 83% of employers in the industry providing such training.

Table 4.7: No. of apprentices ('000s) by industry of employment, Australia, 1995–1997

Industry	1995	1996	1997
Manufacturing	35.2	30.5	25.2
Construction	26.3	27.5	23.2
Wholesale/retail	30.5	28.3	35.3
Accommodation/cafés/restaurants	5.7	8.8	13.7
Cultural/recreation/personal services	8.0	10.6	7.8
Other	**13.5**	**20.6**	**15.9**
Total	**119.2**	**126.3**	**121.1**

Source: ABS, *Transition from education to work*, cat.6227.0, May 1997

Employer support for training

In the 1996 training expenditure survey (TES), employers in this industry were shown to be the third highest spenders on training, behind only the mining and transport industries. During the three-month survey period, electricity, gas and water industry employers spent $481 per employee on structured training, compared with the all-industry average of $185. This also represented a substantial rise from the level of expenditure in 1993, which was $383, although over that period the proportion of employers in the industry providing structured training declined from 60% to 48%.

In the 1996 survey, 10.38 hours of training were provided per employee, which also represented a slight rise over the level pertaining in 1993. Over the same period the

BEST COPY AVAILABLE

average provision in terms of hours per employee across all industries fell from about 5.5 hours to 4.9 hours. Most training was focussed on computer training, health and safety and apprenticeship and traineeship training.

Some training issues in electricity, gas and water

- How can the quality of information on careers and jobs in the industry be improved?
- What should be done to improve the provision of information on course, subject and module content?
- With the high level of redundancies which have occurred in this industry, and their likely continuation as a result of privatisation and technological change, should more be done to promote retraining rather than displacement of redundant employees by newly trained graduates?
- What are the medium-term prospects for the emergence of new technologies and hence new skills, requiring the development of both new courses and new delivery methods? In this regard it is worth noting the motivations of the graduates working in the industry from the GDS, in that the greatest number had work-related reasons for undertaking their TAFE course.
- What measures, if any, can the training sector take to address the marked gender imbalance in the industry?

The NUITAB has identified the following priorities for training reform.

Water sector

- development of national competency standards (NCS) at higher Australian Qualifications Framework (AQF) levels 5–6
- direction of effort toward curriculum development to underpin the existing NCS at AQF 2–4

Gas sector

- development of NCS at AQF 1–4, to be followed in 1997 by the development of underpinning curricula

Electricity supply sector

- completion of the generation competency standards
- development of NCS for the distribution and transmission areas, along with underpinning curricula and assessment frameworks

Electrical/electronic sector

- review of existing NCS
- need for research to determine the skills usage and requirement in a changing technological, economic and organisational environment
- development of relevant traineeships
- development of an assessment model
- promotion of the appropriate training model(s)

Emerging VET issues

The industry, through the NUITAB, identifies two issues that require consideration: assessor training and research. The industry sees value in researching the impact of corporatisation on internal training provision, and women's participation in training and employment in the industry.

Appendix

The following table is extracted from the ANTA resource allocations for 1997 document, available at their website. It shows the planned allocations of government-funded training between the ANTA-defined 'training areas' in terms of 'annual hours curriculum' (AHC).

Table A4.1: Key national shifts in activity between 1996 revised estimates and 1997 projected activity (AHC '000s)

Industry training area	1996 revised	1997 projected	Total increase	Total increase as % of 1996 revised	% of overall increase
Category A					
Arts, Entert, Sports and Rec	11 408	11 928	520	4.6	5.5
Automotive	8 221	8 576	355	4.3	3.7
Building and Construction	18 785	19 009	224	1.2	2.4
Comm Services, Health & Ed	20 910	22 382	1 471	7.0	15.5
Finance, Banking and Insurance	3 420	3 468	48	1.4	0.5
Food Processing	2 454	2 851	396	16.1	4.2
TCF and Furnishings	5 714	5 813	100	1.7	1.0
Communications	1 883	1 963	80	4.3	0.8
Engineering and Mining	15 654	16 607	952	6.1	10.0
Primary Industry	11 874	12 217	343	2.9	3.6
Process Manufacturing	397	479	82	20.6	0.9
Sales and Personal Service	6 527	6 752	225	3.4	2.4
Tourism and Hospitality	16 707	18 151	1 444	8.6	15.2
Transport and Storage	1 686	1 851	164	9.8	1.7
Utilities	11 898	12 145	247	2.1	2.6
Category B					
Business and Clerical	42 412	43 117	705	1.7	7.4
Computing	11 969	12 641	672	5.6	7.1
Science, Technical and Other	6 727	6 870	143	2.1	1.5
Category C					
Gen Education and Training	40 046	41 212	1 166	2.9	12.3
Unallocated	622	779	157	25.2	1.6
Total	**239 316**	**248 810**	**9 494**	**4.0**	**100.0**

Note: TCF – textiles, clothing and footwear

Source: Publications, *ANTA Resource Allocations 1997*, <www.anta.gov.au>

BEST COPY AVAILABLE

Table A4.2: Employed persons by occupation in the electricity, gas and water supply industry, 1987 and 1996

Occupation (ASCO 4-digit)	1987 ('000s)	1996 ('000s)	Change 1987 to 1996 ('000s)	Change 1987 to 1996 Average annual %
2211 Electrical and electronics engineers	4.2	2.3	–1.9	–6.7
3201 Electrical and electronic engineering assoc./technicians	4.7	2.8	–1.9	–5.7
3905 Inspectors and regulatory officers	4.6	2.4	–2.2	–7.2
4103 Metal fitters and machinists	6.0	1.9	–4.1	–12.3
4301 Electrical powerline tradespersons	8.0	4.9	–3.1	–5.4
4309 Electrical mechanics	6.2	6.4	0.2	0.4
4409 Plumbers	4.5	1.7	–2.8	–10.5
5301 Accounting clerks	7.0	3.8	–3.2	–6.7
5999 Other clerks	5.7	2.6	–3.1	–8.6
7105 Truck drivers	4.1	0.7	–3.4	–18.3
7301 Power generation plant operators	5.3	2.7	–2.6	–7.4
8101 Trades assistants	4.7	1.5	–3.2	–12.2
8499 Other construction and mining labourers	3.8	1.8	–2.0	–8.2
8907 Storemen/women	3.5	0.8	–2.7	–15.5
Other occupations	54.1	41.2	–12.9	–3.1
Total all occupations	**126.4**	**77.5**	**–48.9**	**–5.4**

Note: As estimates of less than 3500 are subject to high statistical error, they are listed against specific occupations only where there was a higher estimate in either 1987 or 1996. Where estimates of less than 3500 were recorded for both 1987 and 1996, they are included in the 'other occupations' category

Australian Standard Classification of Occupations (ASCO)

Source: ABS, Labour force survey, unpublished data

BEST COPY AVAILABLE

Table A4.3: Educational attainment of employed persons by industry, occupation (1-digit ASCO) and type of post-school qualification at 1996 Census

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
ASCO code and occupation									
1 Managers and Administrators	1 740	206	464	494	137	3 041	140	563	3 744
2 Professionals	4 646	461	1 113	906	262	7 388	282	1 280	8 950
3 Associate Professionals	837	284	1 777	2 528	511	5 937	364	1 963	8 264
4 Tradespersons and Related Workers	234	102	772	9 716	513	11 337	863	3 509	15 709
5 Advanced Clerical and Service Workers	65	48	84	48	192	437	173	741	1 351
6 Intermediate Clerical, Sales and Service Workers	374	171	455	808	516	2 324	524	5 019	7 867
7 Intermediate Production and Transport Workers	84	37	118	1 334	231	1 804	398	3 617	5 819
8 Elementary Clerical, Sales and Service Workers	59	23	52	326	76	536	108	1 239	1 883
9 Labourers and Related Workers	25	16	49	603	79	772	216	2 747	3 735
0 Inadequately described	47	16	62	437	42	604	87	473	1 164
Not stated	13	4	7	34	6	64	40	105	209
Not applicable	–	–	–	–	–	–	–	–	–
Total	**8 124**	**1 368**	**4 953**	**17 234**	**2 565**	**34 244**	**3 195**	**21 256**	**58 695**

Source: ABS, 1996 Census of population and housing

BEST COPY AVAILABLE

Table A4.4: Educational attainment of employed persons by industry, occupation (3-digit ASCO) and type of post-school qualification at 1996 Census

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
100 Managers and Administrators nfd	153	20	49	52	22	296	17	86	399
110 Generalist Managers nfd	0	0	0	0	0	0	0	0	0
111 General Managers and Administrators	226	23	41	53	11	354	14	52	420
119 Miscellaneous Generalist Managers	19	9	20	29	3	80	3	29	112
120 Specialist Managers nfd	28	3	9	8	0	48	3	7	58
121 Resource Managers	325	43	73	50	38	529	22	105	656
122 Engineering, Distribution and Process Managers	568	79	188	227	33	1 095	58	172	1 325
123 Sales and Marketing Managers	153	8	33	37	14	245	7	60	312
129 Miscellaneous Specialist Managers	264	20	49	35	15	383	14	34	431
131 Farmers and Farm Managers	3	3	0	3	3	12	3	18	33
200 Professionals nfd	74	6	10	6	5	101	3	18	122
210 Science, Building and Engineering Professionals nfd	0	0	0	0	0	0	0	0	0
211 Natural and Physical Science Professionals	303	13	33	18	9	376	13	43	432
212 Building and Engineering Professionals	2 377	230	453	328	46	3 434	102	253	3 789
220 Business and Information Professionals nfd	8	0	4	3	3	18	0	8	26
221 Accountants, Auditors and Corporate Treasurers	657	58	154	31	21	921	42	183	1 146
222 Sales, Marketing and Advertising Professionals	117	12	32	55	14	230	5	104	339
223 Computing Professionals	464	31	167	114	45	821	24	216	1 061
229 Miscellaneous Business and Information Profs	389	65	176	239	88	957	58	362	1 377
230 Health Professionals nfd	0	0	0	0	0	0	0	0	0
231 Medical Practitioners	0	0	0	3	0	3	0	0	3
232 Nursing Professionals	5	16	0	3	3	27	3	0	30
238 Miscellaneous Health Professionals	3	0	3	0	0	6	0	0	6
240 Education Professionals nfd	0	0	0	0	0	0	0	0	0
241 School Teachers	0	0	0	0	0	0	3	0	3
242 University and Vocational Education Teachers	0	0	0	4	0	4	0	3	7

BEST COPY AVAILABLE

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
249 Miscellaneous Education Professionals	16	3	5	8	3	35	3	10	48
250 Social, Arts and Miscellaneous Professionals nfd	0	0	0	0	0	0	0	0	0
251 Social Welfare Professionals	24	0	'3	7	4	38	0	15	53
252 Miscellaneous Social Professionals	119	4	10	8	3	144	4	8	156
253 Artists and Related Professionals	14	6	18	30	4	72	9	22	103
254 Miscellaneous Professionals	73	14	42	52	18	199	14	34	247
300 Associate Professionals nfd	8	3	11	16	5	43	6	27	76
310 Science/Engineering and Related Assoc Profs nfd	16	11	169	135	34	365	17	73	455
311 Medical and Science Technical Officers	84	19	97	69	52	321	19	98	438
312 Building/Engineering Associate Professionals	125	100	1 048	1 654	198	3 125	147	448	3 720
320 Business and Administrative Assoc Profs nfd	0	3	3	0	0	6	0	4	10
321 Finance Associate Professionals	45	15	24	7	10	101	7	96	204
329 Miscellaneous Business/Admin Assoc Profs	417	108	330	437	165	1 457	128	994	2 579
330 Managing Supervisors (Sales & Service) nfd	0	0	0	0	0	0	0	0	0
331 Shop Managers	6	0	4	12	3	25	4	30	59
332 Hospitality & Accommodation Managers	0	0	0	0	0	0	0	7	7
339 Miscellaneous Mngr. Supervisors (Sales & Service)	119	22	69	74	24	308	17	113	438
340 Health and Welfare Assoc Professionals nfd	0	0	0	0	0	0	0	0	0
341 Enrolled Nurses	0	0	0	0	0	0	0	3	3
342 Welfare Associate Professionals	0	0	0	0	0	0	3	3	6
349 Miscellaneous Health & Welfare Associate Profs	0	0	0	0	0	0	0	0	0
390 Other Associate Professionals nfd	0	0	0	0	0	0	0	0	0
391 Police Officers	3	0	0	0	0	3	0	3	6
399 Miscellaneous Associate Professionals	11	3	22	121	16	173	17	66	256
400 Tradespersons and Related Workers nfd	12	3	49	221	10	295	10	82	387
410 Mechanical/Fabrication Engineering Trades nfd	0	0	0	0	0	0	0	0	0
411 Mechanical Engineering Tradespersons	73	17	80	1 366	17	1 553	64	295	1 912
412 Fabrication Engineering Tradespersons	6	0	3	329	5	343	16	66	425

BEST COPY AVAILABLE

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
421 Automotive Tradespersons	0	0	3	300	0	303	9	44	356
431 Electrical and Electronics Trades	54	13	256	5 414	230	5 967	531	1 707	8 205
440 Construction Tradespersons nfd	0	0	0	0	0	0	0	0	0
441 Structural Construction Trades	0	0	0	155	3	158	12	66	236
442 Final Finishes Construction Trades	0	0	0	39	0	39	5	21	65
443 Plumbers	12	8	22	793	30	865	82	538	1 485
451 Food Tradespersons	0	0	0	0	0	0	0	6	6
460 Skilled Agricultural/Horticultural Workers nfd	0	0	0	0	0	0	0	0	0
461 Skilled Agricultural Workers	0	0	0	0	0	0	0	5	5
462 Horticultural Tradespersons	0	3	0	30	5	38	9	47	94
490 Other Tradespersons and Related Workers nfd	0	0	0	0	0	0	0	0	0
491 Printing Tradespersons	6	0	0	12	0	18	3	7	28
492 Wood Tradespersons	0	0	0	3	0	3	0	0	3
493 Hairdressers	0	0	0	5	0	5	0	0	5
494 Textile, Clothing and Related Trades	0	0	0	0	0	0	0	0	0
498 Miscellaneous Tradespersons and Related Wkrs	70	57	358	1 049	210	1 744	120	623	2 487
500 Advanced Clerical and Service Workers nfd	3	0	0	3	0	6	0	0	6
511 Secretaries and Personal Assistants	33	33	47	19	167	299	152	522	973
590 Other Advanced Clerical and Service Wkrs nfd	0	0	0	0	0	0	0	0	0
591 Advanced Numerical Clerks	26	13	26	8	18	91	18	187	296
599 Miscellaneous Advanced Clerical and Service Wkrs	5	0	10	18	7	40	3	31	74
600 Intermediate Clerical, Sales and Service Wkrs nfd	0	0	3	0	3	6	3	7	16
610 Intermediate Clerical Workers nfd	6	0	0	0	3	9	0	5	14
611 General Clerks	71	53	113	135	176	548	158	1 810	2 516
612 Keyboard Operators	22	14	44	29	61	170	66	379	615
613 Receptionists	10	8	8	5	23	54	31	172	257
614 Intermediate Numerical Clerks	56	18	76	50	65	265	64	608	937
615 Material Record and Despatch Clerks	17	7	44	198	40	306	50	528	884

BEST COPY AVAILABLE

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
619 Miscellaneous Intermediate Clerical Workers	153	61	138	304	120	776	138	1 315	2 229
621 Intermediate Sales and Related Workers	43	9	26	64	21	163	7	112	282
630 Intermediate Service Workers nfd	0	0	0	3	0	3	0	0	3
631 Carers and Aides	0	0	3	10	6	19	4	28	51
632 Hospitality Workers	0	0	0	0	0	0	0	17	17
639 Miscellaneous Intermediate Service Workers	3	0	3	10	3	19	3	38	60
700 Intermediate Production and Transport Wkrs nfd	0	0	0	16	6	22	10	76	108
710 Intermediate Plant Operators nfd	3	0	5	38	3	49	17	145	211
711 Mobile Plant Operators	0	0	0	97	17	114	42	409	565
712 Intermediate Stationary Plant Operators	64	20	74	673	115	946	172	1 225	2 343
720 Intermediate Machine Operators nfd	0	4	18	160	17	199	37	319	555
721 Intermediate Textile/Clothing/Related Mach Ops	0	0	0	3	0	3	0	8	11
729 Miscellaneous Intermediate Machine Operators	0	0	0	8	3	11	4	34	49
731 Road and Rail Transport Drivers	3	5	4	155	12	179	57	874	1 110
790 Other Intermediate Prod'n & T'port Wkrs nfd	0	0	0	0	0	0	0	3	3
791 Intermediate Mining and Construction Workers	0	3	3	71	49	126	24	133	283
799 Misc Intermediate Prod'n and Transport Wkrs	7	4	13	115	9	148	35	391	574
800 Elementary Clerical, Sales and Service Wkrs nfd	0	0	0	0	0	0	0	0	0
811 Elementary Clerks	40	10	26	253	46	375	72	888	1 335
820 Elementary Sales Workers nfd	0	0	0	0	0	0	0	0	0
821 Sales Assistants	10	6	16	37	16	85	12	143	240
829 Miscellaneous Elementary Sales Workers	6	3	5	3	10	27	14	116	157
831 Elementary Service Workers	3	4	5	33	4	49	10	91	150
900 Labourers and Related Workers nfd	0	0	4	74	7	85	42	470	597
911 Cleaners	3	4	4	40	9	60	19	369	448
920 Factory Labourers nfd	0	0	0	0	0	0	0	3	3
921 Process Workers	0	3	0	33	6	42	10	156	208
922 Product Packagers	0	0	0	3	0	3	0	8	11

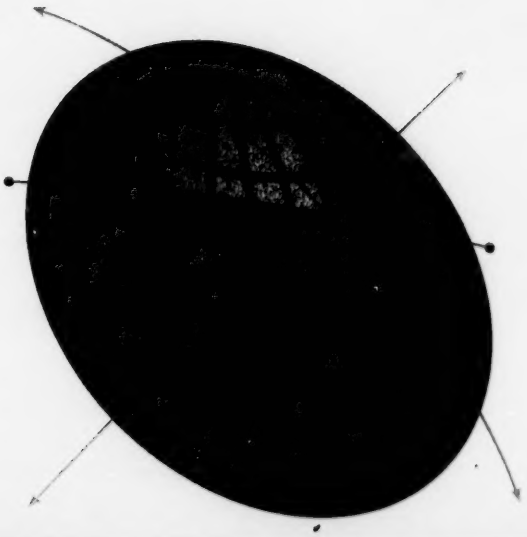
BEST COPY AVAILABLE

Electricity, gas and water supply	Bachelor degree or higher	Undergraduate diploma	Associate diploma	Skilled vocational qualification	Basic vocational qualification	With qualifications	Inadequately described or not stated	Not applicable (no quals.)	Total
990 Other Labourers and Related Workers nfd	0	0	0	8	3	11	0	25	36
991 Mining, Construction and Related Labourers	3	3	8	184	27	225	68	833	1 126
992 Agricultural and Horticultural Labourers	0	0	0	32	5	37	10	130	177
993 Elementary Food Preparation and Related Wkrs	3	3	0	3	0	9	0	19	28
999 Miscellaneous Labourers and Related Workers	15	4	31	230	20	300	63	734	1 097
099 Inadequately described	47	16	62	437	42	604	87	473	1 164
Not stated	13	4	7	34	6	64	40	105	209
Not applicable	–	–	–	–	–	–	–	–	–
Total	**8 117**	**1 363**	**4 946**	**17 240**	**2 567**	**34 233**	**3 192**	**21 253**	**58 678**

Note: nfd – not further defined

Source: ABS, 1996 Census of population and housing

BEST COPY AVAILABLE



BEST COPY AVAILABLE